

Eupithecia extensaria (Freyer, 1844) (Geometridae) in Poland

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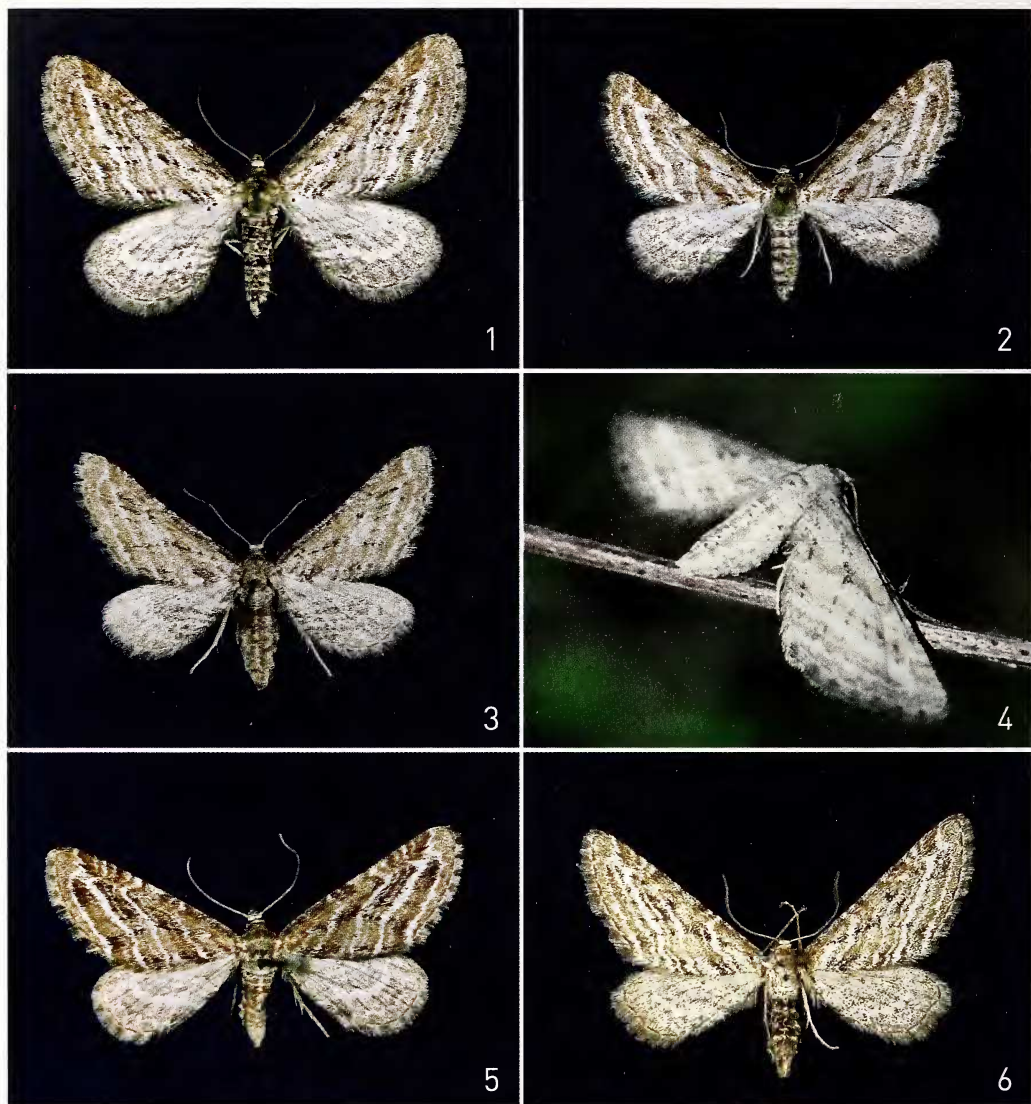
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Abstract. An isolated population of *Eupithecia extensaria* (Freyer, 1844) was found in Poland. The species' external characters of the imago and larva, the genital morphology, and the life history and distribution are discussed. The local habitat is characterized.

Zusammenfassung. Eine isolierte Population von *Eupithecia extensaria* (Freyer, 1844) wurde in Polen entdeckt. Die Larval-, Imaginal- und Genitalmorphologie sowie der Lebenszyklus und die Verbreitung werden diskutiert und lokale Habitatsprüche beschrieben.

Introduction

One of the most unusual and spectacular moth discoveries in the last decade in Poland and the middle part of Europe on the whole was the case of *Eupithecia extensaria* (Freyer, 1844). We could have expected this species in the north-eastern part of Poland, after the report of the first record of the species in Lithuania, in the vicinity of Vilnius (Wilno) in 1971 (Kazlauskas 1984), which was also the first case of occurrence in this country. Recently, more Lithuanian records were reported, one of them close to the Polish border (Ivinskis 2004). These records and two older records from Latvia by Lienig & Zeller (1846), in which the species is reported under the name *Larentia prolongata* Lienig & Zeller (holotype at BMNH), form the Baltic part of the main continental range. All of these moths are of the nominotypical form. The species' distribution extends far eastward through the Pskov and Moscow regions, Central Asia, to Japan, and it shows wide phenotypical variability. The southern limit of the species in Europe is along the Black Sea coast (Romania and Ukraine), Caucasus, Transcaucasus, and Turkey, where only two localities are known (Mironov 2003). It is difficult to define the subspecific status of Turkish populations because the few known specimens differ only slightly from the nominotypical subspecies (Fig. 6), and the female genitalia do not show any difference. In western Europe it inhabits the North Sea coast in England, where it is closely bound to the coastal saline zone where it is rather rare. The other westernmost locality is in the Spanish province of Teruel where it is known from a single specimen collected at the altitude of 1600 m (Mironov 2003). The British and Spanish specimens are classified as ssp. *occidua* Prout, 1914 (Fig. 5). Two other subspecies were described from Asia: ssp. *sydyi* Staudinger, 1885 from China (widespread in Central Asia) and ssp. *leuca* Dietze, 1910 from Ussuri (widespread in Far East Russia, Korea, and Japan). On plate 13 of Prout (1914), in rows 'i' (not 'g' as stated in the text) and 'o' the illustrations of ssp. *occidua* and the nominotypical ssp. (as "*prolongata*") were mistakenly inverted. To make matters worse Prout (1914) treated these names as synonyms in the text volume,



Figs 1–6. Variability of wing pattern and form of *Eupithecia extensaria* (Freyer). **1–4.** Poland, Głęboćzek Wielki. **1.** Male. **2–4.** Females. **5.** England, Hunstanton, male. **6.** Turkey, Dog. Karadeniz Daglari, female.

which is an apparent mistake because the holotype of *Larentia prolongata* Lienig & Zeller, 1846 represents the nominotypical form.

In Poland the species was discovered in 1998 in Głęboćzek Wielki (53°19'00" N, 19°31'41" E; UTM: DE00) – a locality situated northeast of Brodnica, and introduced to the list of Polish Geometrids (Malkiewicz & Sosiński 1999, 2000).

Abbreviations

BMNH	British Museum (Natural History), London
ISZP	Instytut Systematyki i Ewolucji Zwierząt PAN, Kraków
MPUW	Muzeum Przyrodnicze Uniwersytetu Wrocławskiego, Wrocław



Fig. 7. Habitat of *Eupithecia extensaria* (Freyer) in Poland, Głęboczek Wielki. (in 1999).

Methods and terminology

The method of vesica eversion was taken from Sihvonen (2001). All membranous parts were coloured with chlorazole black. Morphological terms are basically from Hausmann (2001) and Mironov (2003), with some additions with regards to the phallus. The localization of the cornuti was described with the vesica everted.

Eupithecia extensaria (Freyer, 1844)

Material. **Great Britain:** 1♀, England, Norfolk, ISZP; 1♂, Hunstanton, 3.vi.1909, Newman, MPUW (ex. anonymous coll.). **Poland:** 6 spp., Głęboczek Wielki, 11.v.1998, leg. Buszko; 15 spp., same locality, 20.v.1999, (ix.1999, 2 spp. ex ovo), leg. Buszko & Malkiewicz; 4 spp., same locality, 17.v.2002, leg. Buszko, Gelbrecht & Malkiewicz; coll. Malkiewicz. **Turkey:** 2♀, Province Erzurum, Dog. Karadeniz Daglari: Korga Dagi, Umg. Köprüköy bei Ispir, 1600–2000 m., 3.–7.vi.2000, leg. Gelbrecht, Drechsel, Busse & Schwabe, coll. Gelbrecht.

Life history and habitat. The flight period, based on voucher material, extends from early May (end of first decade) to the beginning of June, depending on weather conditions. Moths fly readily during the day in full sunshine and sit on plants in a characteristic position (Fig. 4). There were also moths noticed flying at dusk and occasionally coming to light. Under breeding conditions a few specimens of a second generation emerged in September. The larvae are green with a white spiracular line and with seven rosy dots interrupting it on each abdominal segment (Fig. 8). The body is covered with minute white pinacula. Larvae grow slowly, so they can be collected throughout the summer season. They feed on the leaves and flowers of *Artemisia campestris* L. (Asteraceae). The open habitat is on sandy soil; it was artificially created quite recently as a result

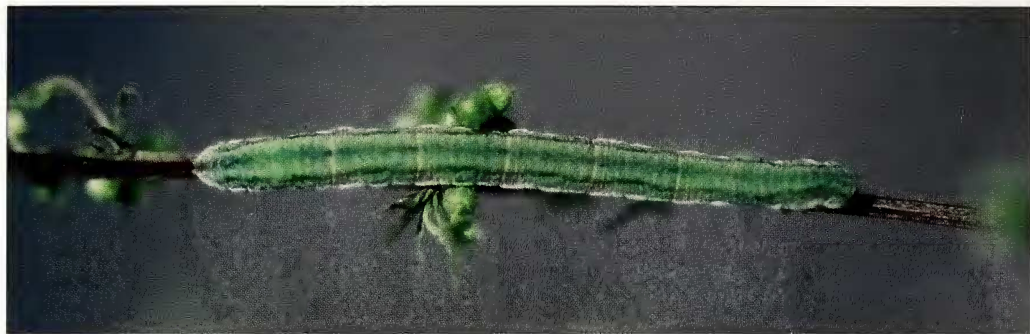
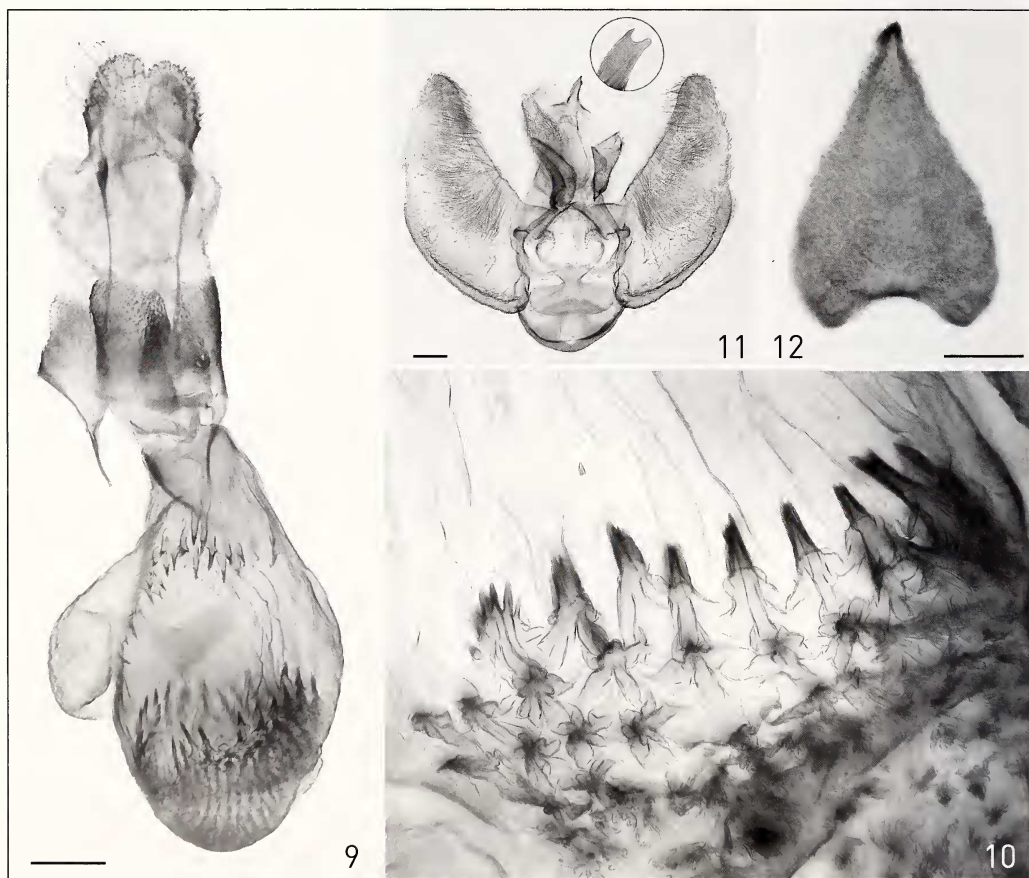
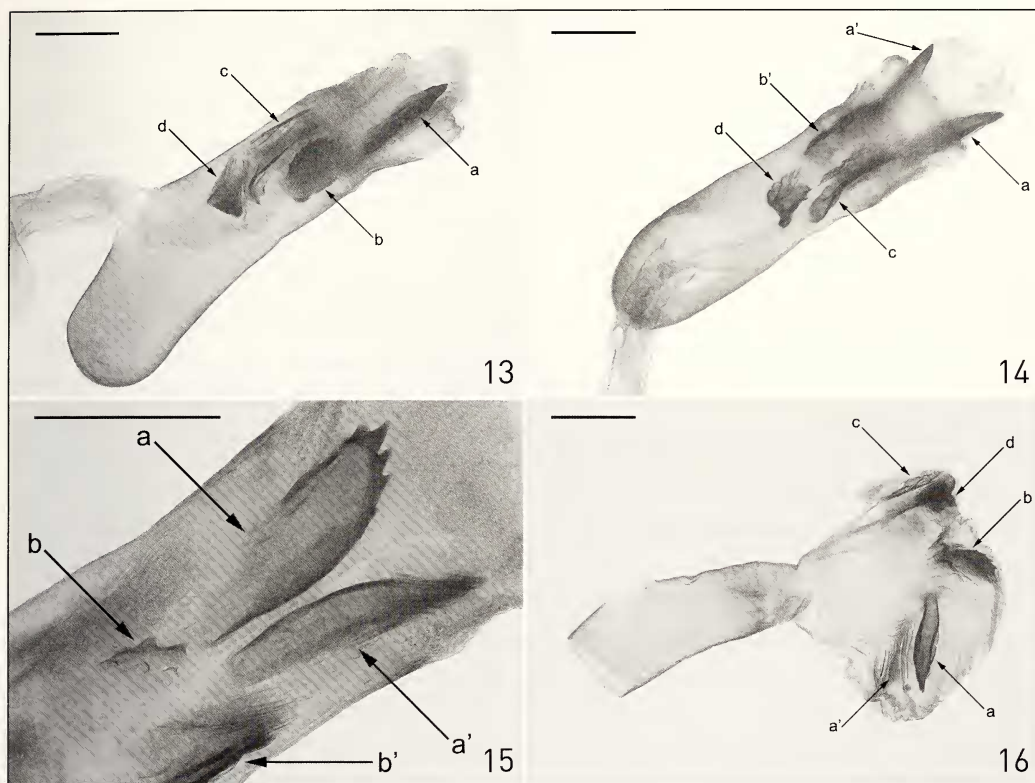


Fig. 8. *Eupithecia extensaria* (Freyer), last instar caterpillar from Poland, Głęboczek Wielki.



Figs 9–12. *Eupithecia extensaria* (Freyer) from Poland, Głęboczek Wielki: female and male genitalia. 9. Female genitalia, dorsal view (precopulation form of corpus bursae). 10. Variability of corpus bursae spines, ventral view (upper border of bottom spines area). 11. Male genitalia, general view (phallus removed) with uncus enlarged (in lateral, left view). 12. Sternite A8. (scale bars 0.1 mm)

of the restoration of a large gravel pit. It was populated predominantly with *Artemisia campestris* and *Helichrysum arenarium* (L.) Moench (Asteraceae). Initially, pine and birch trees were planted over the area (Fig. 7) and now they attain about 5 m in height.



Figs 13–16. The phallus of *Eupithecia extensaria* (Freyer). **13.** Phallus with cornuti, lateral, left view; **a.** left, ventral dentate cornutus; **b.** left, medial dentate cornutus; **c, d.** dorsal dentate cornuti: **c.** U-shaped cornutus, **d.** small curved cornutus. Poland, Głęboczek Wielki. **14.** Phallus with cornuti, dorsal view; **a.** left, ventral dentate cornutus, **a'.** right, ventral dentate cornutus; **b'.** right, medial dentate cornutus; **c.** U-shaped cornutus; **d.** small curved cornutus. Poland, Głęboczek Wielki. **15.** Phallus and variability of dentate cornuti, ventral view; **a.** left ventral cornutus, **a'.** right ventral cornutus; **b.** left medial cornutus, **b'.** right medial cornutus. England, Hunstanton. **16.** Phallus with everted vesica, lateral, left view (coecum and bulbous ejaculatorius removed); **a.** left, ventral dentate cornutus, **a'.** right, ventral dentate cornutus; **b.** left, medial dentate cornutus; **c.** U-shaped cornutus; **d.** small curved cornutus. Poland, Głęboczek Wielki. (scale bars 0.1 mm).

It seems that in Poland the species is bound to a habitat which may be regarded as a secondary steppe with *Artemisia campestris* on artificially cleared ground. This kind of habitat is very frequent in exploited and abandoned gravel pits in the Polish lowlands. However, the species was not spotted since 2005 at this locality.

Discussion

The Polish specimens probably belong to the nominate subspecies, which was recently redescribed by Mironov (2003). The variability in external characters is wider than that stated and illustrated by this author, so below are some supplementary characters and differences.

The wingspan of the specimens from Poland extends between 21–24 mm (mean 22.6 mm) and differs from that of British (ca. 22 mm) and Turkish specimens (ca. 20

mm). The forewing is variable in shape, narrow and long, and shorter and narrower in females when compared to that of the males (Figs 1–4).

The forewing dark spots and short commas on the veins at the antemedial and postmedial lines are not always clear. The medial line (*sensu* Hausmann 2001) varies in width, and in some cases it is thinner medially. The discal spots are often visible as very small points by or on the medial line. The white areas between lines are of variable width. The white and gray contrasting pattern is (fig. 122a in Mironov 2003, and fig. 382 in Buszko 2000) in some cases more uniform and yellowish. The western ssp. (*occidua* Prout) has a highly contrasting brown pattern with narrow white stripes in between, as stated by Mironov 2003 (p. 277), but it is not ‘brighter’ than the nominate subspecies (Fig. 5). The ash-grey abdomen dorsally has a white line with lateral brown dots, except on the last segment.

The male genitalia are typical for the *satyrata* species group (Fig. 11). The vesica is armed with six cornuti that are well visible when the vesica is not everted (Figs 13–14). The arrangement of the cornuti on the everted vesica (Fig. 16) is almost spherical and quite symmetric, when looking ventrally. The surface of the vesica is mostly smooth like in all species of the *satyrata* group, but the dense denticles in the basal (anterior) part are discernible. The cornuti are arranged in pairs as noticed by Mironov (2003), but in our preparations the cornuti in pairs are not identical and can differ to considerable degree. The ventral pair (‘near apex’ according to Mironov 2003) can especially differ in form. The next pair is also variable in size and form, being more or less dentate (Fig. 15, medial dentate pair). An elongated U-shaped cornutus and a small curved cornutus are situated near the base of the ductus ejaculatorius. Sternite A8 (Fig. 12) is shorter with more strongly curved lateral margins and a more heavily sclerotized apical margin in comparison with the illustrations of Mironov (2003).

In female genitalia the bursa copulatrix is pear-shaped, narrower than in other European species of the *satyrata* group (Fig. 9). The deep membranous gap separating spines on the left side is variable in width (depending on physiological state), and in most cases there is a row of small spines near the base of the ductus seminalis. This gap is expanded toward the bottom of the bursa, which is not completely covered with spines. Spines are variable in size and form, in some Polish specimens they are forked sometimes more than once (Fig. 10). The anterior margin of tergite A8 is not so convex medially as in the illustrations of Mironov (2003).

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